ANIMA
Aviation Noise Impact Management through Novel Approaches

Case Study – Catania Airport

Background

Catania Airport is the 6th largest airport in Italy in terms of passenger volume, with over 9 million passengers, 6700 tonnes of goods and 68000 flights in 2017[1].
The airport has only one runway (08-26) with orientation east-west, which is located closely to the sea and approximately 5 km away from the City of Catania.

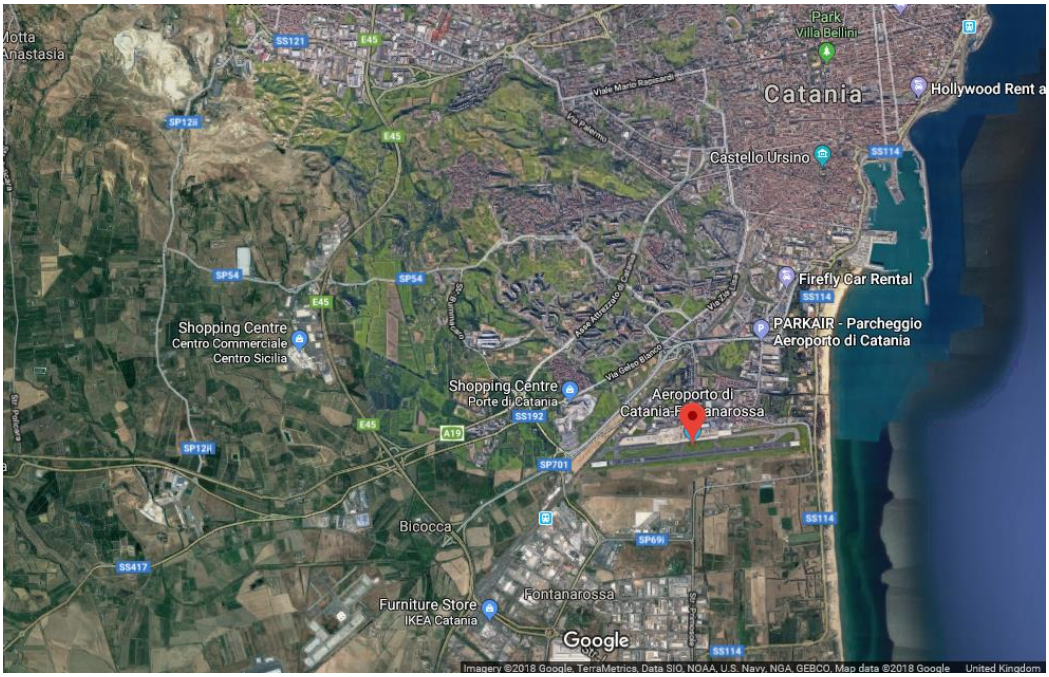
Airport Characteristics	
Airport Name	Catania
ICAO Code	LICC
IATA Code	CTA
Geographic Coordinates	37°28'00'' N 15°03'50'' E
Altitude	12 m
Tracks number	1
Type of Track	08-26 Strumentale di precisione
Helicopters	NO – AD (Aerodromo) open, with restrictions, only civil helicopters but after authorisation only.
Airport surface	≈230 ha
Type of management	As a whole
Managing/Responsible Entity	S.A.C. S.p.a.

The whole airport surface is within Catania City Council, however, aeronautical activities (departure and landing) are over other council's territory, Misterbianco, where no residential buildings are present.

The urban areas, closest to the airport and its activities, are:

- North – the residential areas of Catania between San Giuseppe da Rena St. And Santa Maria Goretti St.;
- West – the village of Librino (between motorway A19 and SS 192 road);
- South West – the villages of Fontanarossa and Torregalliera (industrial areas);
- East – mainly touristic activities, the beach.

[1] http://www.assaeroporti.com/statistiche_201712/



In the wider areas around Catania Airport other noise sources are present, which come from transport systems, such as the rail line in the west of the airport, in proximity of the end of track 08, the SP55 road, which is parallel to the rail line and the military heliport "Mario Calderara".

From a legislative point of view, the noise zoning system with noise maps was approved in 2005 by the Commission ex Article 5 of D.M. 31 October 1997 and Catania Council's acoustic classification plan was approved on 4 March 2013.

Noise monitoring network

The Noise monitoring network at Catania Airport is constituted by monitoring system of three fixed and one mobile noise monitoring sites, located within the airport land, as per illustration below. The whole airport complies with the ARPA guidelines ("Linee guida per la progettazione e la gestione delle reti di monitoraggio acustico aeroportuale") and the table below illustrates the characteristics of the noise monitoring network.

ID number	Site name	Location	Coordinates	Related Weather station
P1 - 1301	Testata 26	Inside (B)	37° 27' 58.94" N 15° 4' 56.59" E	SI "Vaisala Weather Transmitter WXT533"
P2 - 1302	Testata 08	Inside (A)	37° 27' 47.28" N 15° 2' 59.00" E	SI "Vaisala Weather Transmitter WXT533"
P3 - 1303	Pista lato sud	External	37° 27' 43.77" N 15° 3' 54.25" E	NO
P4 - 1304	Mobile	N.D.	N.D.	NO

(source, page 7)

Other Information

The responsible authority is SAC S.p.A. and the main legislative references for the noise impact assessment are the following:

- **Legge 447 del 26/10/1995**: "Legge Quadro sull'inquinamento acustico".
- **D.M. 31/10/97**: "Metodologia di misura del rumore aeroportuale".
- **D.P.C.M. 14/11/97**: "Determinazione dei valori limite delle sorgenti sonore".
- **D.P.R. 11/12/97 n. 496**: "Regolamento recante norme per la riduzione dell'inquinamento acustico prodotto dagli aeromobili civili".
- **D.M. 16/03/1998**: "Tecniche di rilevamento e di misurazione dell'inquinamento acustico".
- **D.M. 20/05/1999**: "Criteri per la progettazione dei sistemi di monitoraggio per il controllo dei livelli di inquinamento acustico in prossimità degli aeroporti nonché criteri per la classificazione degli aeroporti in relazione al livello di inquinamento acustico".
- **D.P.R. 09/11/99 n. 476**: "Regolamento recante modificazioni al D.P.R. 11/12/97 n. 496, concernente il divieto dei voli notturni".
- **D.M. 3/12/1999**: "Procedure antirumore e zone di rispetto negli aeroporti".
- **D.M. 29/11/2000**: "Criteri per la predisposizione, da parte delle società e degli enti gestori dei servizi pubblici di trasporto o delle relative infrastrutture, dei piani degli interventi di contenimento e abbattimento del rumore".
- **D.lg. 17/01/05 n. 13**: "Attuazione della direttiva 2002/30/CE relativa all'introduzione di restrizioni operative ai fini del contenimento del rumore negli aeroporti comunitari".
- **D.lg. 19/08/05 n. 194**: "Attuazione della direttiva 2002/49/CE relativa alla determinazione e alla gestione del rumore ambientale".

At the regional level, current applicable legislation for noise assessment is:

- **D.D.L. n. 457 del 23/05/97**: "Norme per la tutela dell'ambiente abitativo e dell'ambiente esterno dall'inquinamento acustico".
- **Decreto Assessoriale del 11/09/07**: "Linee guida per la classificazione in zone acustiche del territorio dei comuni della Regione siciliana".

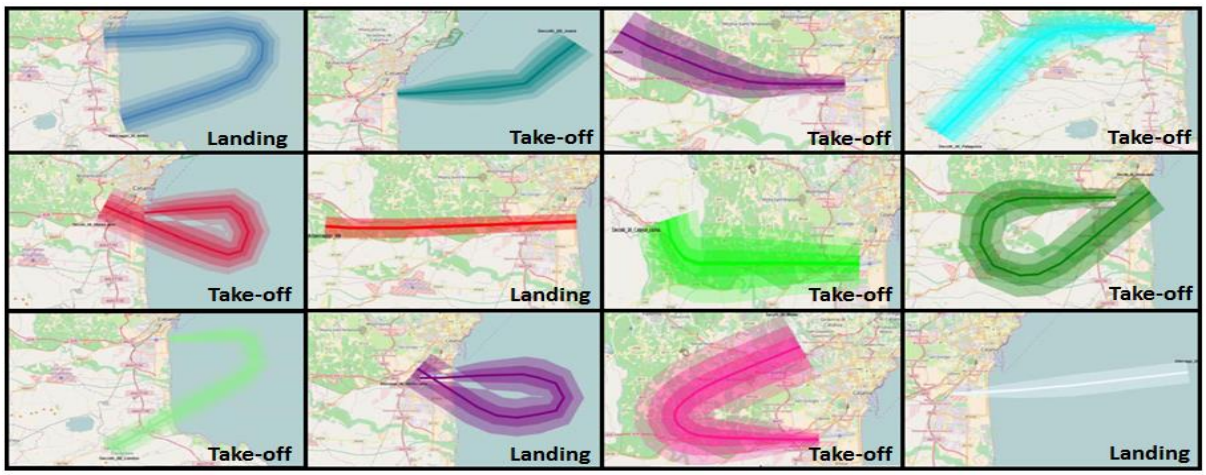
Noise Maps

Noise maps have been generated in 2017, using a specific software – Integrated Noise Model (INM).

Noise abatement measures

Operating restrictions
allowed only by Chapter 3 (Annex 16 ICAO) aircraft or above; restricted night flights.

Operational Procedures
departure NAPD1; Approach CDA; Distribution of the flights during the day.



Land use case study

Noise Zoning

Italian legislation on land use planning of Local Authority defines the use for each parcel of land depending on the level of noise exposure. It generally consists of a zoning ordinance which specifies land development and use constraints based on certain noise exposure levels. Noise zoning is applied in nearly all countries as a physical planning measure to prevent new noise-sensitive developments near the airport. Ideally, noise zoning should be established for all airports. Noise zoning should be used constructively to increase the value and ofts that have not yet felt the impact of buildings. Noise zoning around airports is applied in nearly all surveyed countries as a physical planning measure. However, it is sometimes only applied to the larger or national airport.

Airport binding zones

According to the Article 707 of the "Codice della Navigazione del Regolamento per la Costruzione e l'Esercizio degli Aeroporti" (2nd Edition of 21 October 2003, amendment 5), binding zones are defined when in proximity of airports, preventing obstacles and danger for both airport operations and public safety. As a result, binding maps are generated to govern and manage the land and the flight operations safely.
In line with International Technical Legislation Chapter 4 (rules for construction and operation of airports), Catania Airport has adopted a binding (or incompatibility) zoning system (figure 11.1), following two main rules:

1. *Absolute incompatibility of land* – footprint of encroachment, landing and departure contour and the ATZ "Aerodrome Traffic Zone";
2. *Evaluation dependent incompatibility of land* – every zone between the external boundary of the ATZ and the radius of 15 km from the Airport Reference Point (ARP).

Figure 11.1 showcases an example of the zoning.

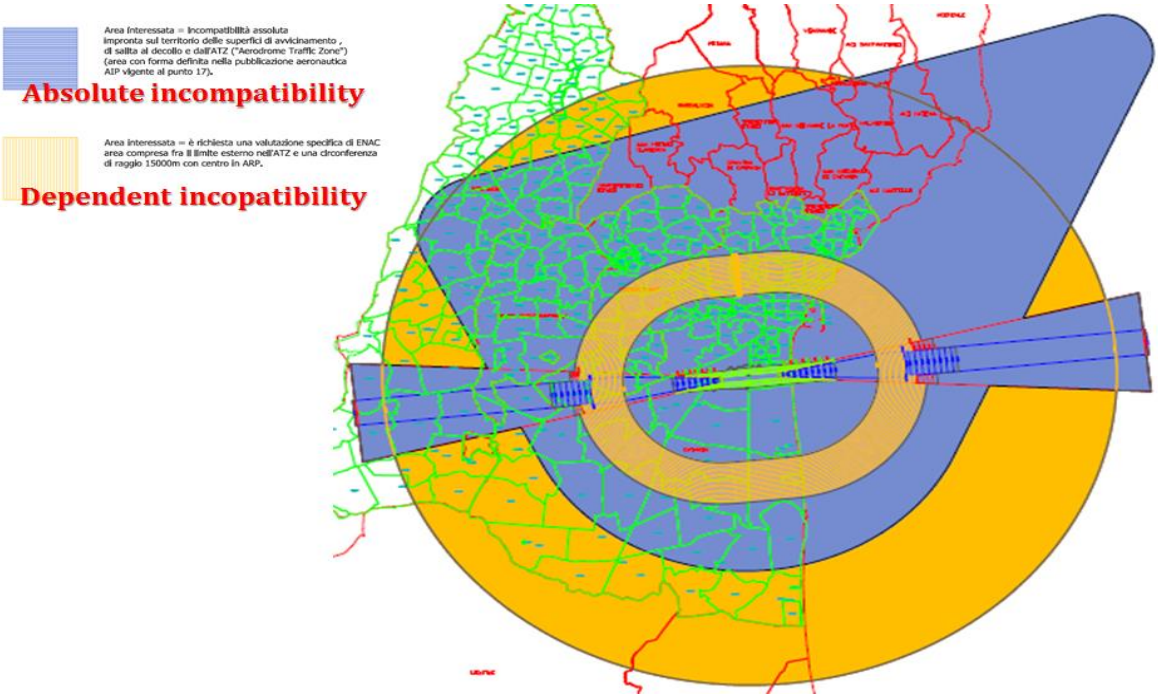


Figure 11.1 – Airport binding zones of absolute and dependent incompatibility [1]

The process followed with the indication of the Act on 15 March 2006 specifically based on the instructions of the article 707 – it is necessary to develop adequate binding maps around airports in order to be published and made executable by an Italian procedure developed by ENAC (31 May 2007 protocol 0034982/AOC/DIRGEN).
The ENAC procedure is organised in different phases, described in detail by guidelines developed by ENAC, with the main objective to create a standardisation from a graphic and application point of view, to allow a unitary digitalisation and centralisation of the data. Also, based on experience and airport operators' feedback, ENAC has recently updated the guidelines.
The procedure consists in developing binding maps that take into account the land registry information (dati catastali) and other geographical information, building height, etc.

Barriers and gaps
During the implementation period there have been some gaps, especially in the identification of all necessary land registry information. Particularly, there was some misalignment of consecutive maps, thus creating some gaps or duplication in the land information.

Detailed matching building vs zoning

A detailed study has been carried out for the different residential properties, located at the edge of the noise zones between 60 dbA and 65 dBA (Figure 11.2). This was necessary, as several buildings were constructed at the boundary or very close to the relevant noise contours and the airport wanted to be sure to truly assess the level of noise for those specific buildings and their puspose of use.

Figure 11.2 – Noise maps of Catania Airport and location of sensitive buildings [2]

For a few buildings, according to modelling results (noise maps, Figure 11.3), a more detailed study using site specific monitoring was required. Also, from the purpose of use, a sub-set appears to be only day activities (such as offices).
Results from the detailed monitoring activity has revealed lower levels of noise than those which were modelled, providing evidence that those buildings were not subjected to restrictive legislation.

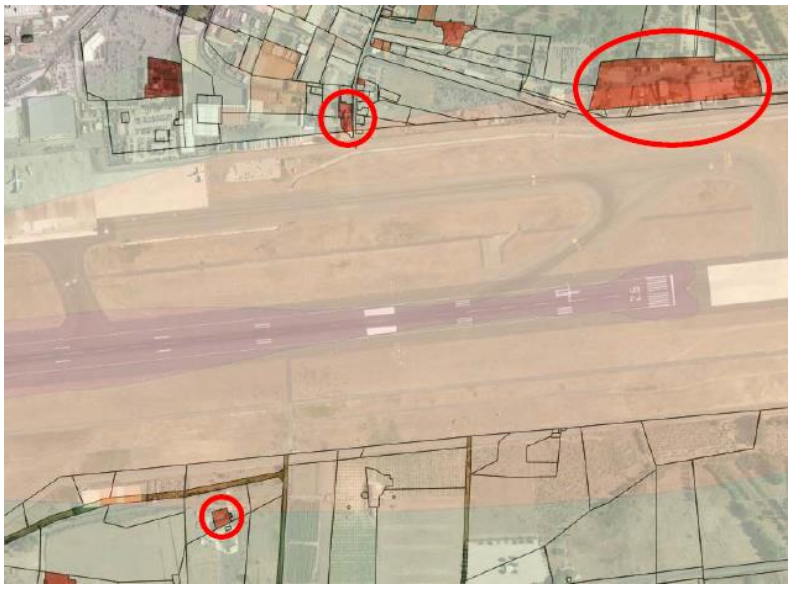


Figure 11.3 – Buildings identified as requiring a more detailed monitoring exercise [2]

Conclusions

This case study shows the importance of accurate input data in order to refine and improve modelling results as well as the important role of site-specific monitoring activities.
As a result of this initial case study, Catania Airport now performs regular site monitoring using mobile systems to make sure modelling results are constantly validated.
Also, there is a plan for extending the monitoring systems with new equipment to be located permanently on those areas and in proximity of buildings within the Zone B (65 dBA).

References

1. SAC, 2011. Aeroporto di Catania. Mappe di Vincolo Ostacoli e Pericoli alla Navigazione Aerea. D.Lgs N.151, 15/03/2006 Codice della Navigazione Art.707 Comma 1. Relazione Tecnica
2. Softech, 2017. Action Plan 2018 – 2023 for Aeroporto Vincenzo Bellini di Catania-Fontanarossa. D.Lgs. 194/05. Sintesi non tecnica.
3. Italian END (Enviromental Noise Directive), D.Lgs. 194, 19 August 2005 and modified by D.Lgs. 42, 17 February 2017